

UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK

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CARNEGIE INSTITUTE OF WASHINGTON :  
et al., :  
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Plaintiffs, : 20-cv-189 (JSR)  
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-v- :  
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PURE GROWN DIAMONDS, INC. et al., :  
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Defendants. :  
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CARNEGIE INSTITUTE OF WASHINGTON :  
et al., :  
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Plaintiffs, : 20-cv-200 (JSR)  
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-v- :  
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FENIX DIAMONDS, LLC : OPINION AND ORDER  
 :  
Defendant. :  
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JED S. RAKOFF, U.S.D.J.

"Diamonds are a girl's best friend,"<sup>1</sup> even if they are grown in a lab. At least this is the view of the plaintiffs in these consolidated actions, who describe themselves as "pioneers in

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<sup>1</sup> From the song of the same title sung first by Carol Channing and then by Marilyn Monroe in, respectively, the Broadway musical *Gentlemen Prefer Blondes* (1949) and the Hollywood movie of the same name (1953). Aficionados of James Bond movies would want to add that boys are also often enamored of diamonds. See *Diamonds Are Forever* (1971).

the laboratory synthesis of high-clarity diamonds.” PGD Compl. ¶ 4.<sup>2</sup> Plaintiff Carnegie Institute of Washington, a Washington, DC corporation, is the assignee of the two patents-in-suit. Id. ¶ 2. Plaintiff M7D Corporation, a Delaware corporation, is the licensee of both patents with rights to enforce them. Id. ¶ 6. Plaintiffs sue co-defendants Pure Grown Diamonds, Inc. and IIA Technologies PTE, Ltd. (collectively “PGD”), id. ¶¶ 92-141, as well as defendant Fenix Diamonds LLC (“Fenix”), Fenix Compl. ¶¶ 61-102,<sup>3</sup> for direct, induced, and willful infringement. Before the Court now are defendants’ motions to dismiss, as well as the parties’ various disputes over claim construction.

#### **BACKGROUND**

A diamond is a form of solid carbon with recognizable characteristics resulting from the carbon atoms being arranged in a particular crystalline structure. PGD Compl. ¶ 76. Diamonds form naturally deep within the earth’s crust where carbon is subject to extremely high temperatures and pressures. Id. But what takes Mother Nature eons to produce can now be produced in a laboratory in a matter of days, using various techniques.

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<sup>2</sup> Citations to the PGD complaint refer to the complaint in the Pure Grown Diamonds et al. action, 20-cv-189 (JSR), ECF No. 1 (Jan. 9, 2020).

<sup>3</sup> Citations to the Fenix complaint refer to the amended complaint in the Fenix action, 20-cv-200 (JSR), ECF No. 16 (Mar. 5, 2020).

These diamonds have the same “physical, chemical and optical qualities” as natural diamonds. Id. ¶ 77.

One such method for producing synthetic diamonds is called chemical vapor deposition (CVD). Broadly speaking, the CVD process begins with a tiny diamond “seed,” which is “grown” into a full diamond by placing the seed in a “deposition chamber” and filling that chamber with energized hydrocarbon gases. Id. ¶ 78. CVD diamond production has existed for several decades, see ‘078 Patent, infra n.4, at 1:30-41, but the two patents-in-suit both describe particular methods that claim to improve upon the prior art for producing and purifying these diamonds.

The first patent-in-suit, the “‘078 Patent,”<sup>4</sup> relates to a particular type of CVD production called microwave plasma CVD (MPCVD). In brief, MPCVD production involves placing a diamond seed into an enclosure, removing the ambient air from the enclosure, releasing hydrocarbon gases into the enclosure, and then turning those gases into plasma using microwaves, all while creating particular temperatures and pressure conditions around the diamond seed. See Pls.’ Opening Claim Construction Br. at 3, No. 20-cv-189 (JSR), ECF No. 31 (Apr. 8, 2020).

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<sup>4</sup> Apparatus and Method for Diamond Production, U.S. Patent No. US 6,858,078 (filed Nov. 6, 2002) (issued Feb. 22, 2005).

MPCVD diamond production was also known in the prior art, see '078 Patent at 1:42-51, but the '078 Patent describes a method for improving upon earlier production techniques in order to overcome a limitation inherent in those methods. Specifically, the prior methods caused a trade-off between diamond growth rate and quality, with attempts to produce high-quality "single crystal" diamonds at rates higher than about one micrometer per hour resulting in unwanted "twinned" diamonds or "polycrystalline" diamonds. '078 Patent at 1:52-59. These earlier methods also required that the gases in the chamber be maintained at low pressures. Id. at 1:59-61. The '078 Patent, in contrast, claims to improve upon the prior art by describing a method for producing single crystal MPCVD diamond at a higher growth rate. See Id. 1:64-67. As relevant to the instant lawsuit, this result is achieved by creating temperature and pressure conditions that fall within particular ranges and – importantly – by controlling the temperature gradients across the growth surface of the diamond seed such that they are less than 20°C. Id. 3:7-13.

The second patent-in-suit, the "'189 Patent,"<sup>5</sup> describes a method for repairing visual and other defects, such as

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<sup>5</sup> Method of Making Enhanced CVD Diamond, U.S. Patent No. US RE41,189 (filed Jan. 30, 2009) (issued Apr. 6, 2010).

impurities and structural flaws, in lab-grown CVD diamonds. '189 Patent at 1:10-21, 43-49. For example, this method can be applied to CVD diamonds that appear "very dark" or even opaque after manufacture, in order to turn them clear so as to make them suitable for jewelry. See Pls.' Opening Claim Construction Br. at 6.

The claimed method involves encapsulating the diamond in an outer body, typically of graphite, and "annealing" it, i.e., applying very high temperatures and pressures within specific ranges. '189 Patent at 1:51-60; see Pls.' Opening Claim Construction Br. at 6-7. As with the '078 Patent, this invention builds upon existing knowledge. Here, it was known in the prior art that diamonds change their optical properties under high-pressure, high-temperature ("HPHT") conditions, but previous attempts to anneal CVD diamonds had worsened the optical defects in the diamonds or even converted them into graphite. '189 Patent at 2:29-40; see Pls.' Opening Claim Construction Br. at 6-7. The annealing method described in the '189 Patent avoids these earlier problems.

#### **MOTIONS TO DISMISS**

Defendants move to dismiss plaintiffs' infringement lawsuits on two grounds. First, PGD argues that the asserted claims are unpatentable under 35 U.S.C. § 101 because they are

natural phenomena.<sup>6</sup> Second, all defendants argue that plaintiffs' allegations in the respective complaints do not plausibly allege infringement.

#### **A. Patentability Under 35 U.S.C. § 101**

35 U.S.C. § 101 provides that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor . . . ." This statute, however, implicitly excepts "[l]aws of nature, natural phenomena, and abstract ideas," which are not patentable. Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66, 70 (2012) (quoting Diamond v. Diehr, 450 U.S. 175, 185 (1981)).

In Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 217-18 (2014), the Supreme Court set forth a two-step framework for determining whether this exception applies. At step one, the reviewing court must determine whether the patent's claims are "directed to" a natural phenomenon. Id. at 217. If so, then the court proceeds to step two, at which it searches the claim for "an 'inventive concept,' – i.e., an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the

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<sup>6</sup> Fenix does not raise this argument, but were the Court to declare the patents-in-suit ineligible on this ground, such a holding would also require dismissal with prejudice of the complaint against Fenix.

[ineligible concept] itself.’” Id. at 217-18 (quoting Mayo, 566 U.S. at 72-73) (internal quotation marks omitted) (alteration in original). If it does not contain such a concept, then the subject of the claim is patent-ineligible as a natural phenomenon or abstract idea. Further, when the pleadings are sufficient to resolve the issue, district courts may consider patent ineligibility under the doctrine of Mayo and Alice at the motion-to-dismiss stage. See Genetic Techs. Ltd. v. Merial L.L.C., 818 F.3d 1369, 1373 (Fed. Cir. 2016).

In this case, the Alice inquiry for both patents-in-suit ends at step one, as neither patent is “directed to” a natural phenomenon. The ‘078 Patent teaches a method for growing synthetic diamonds in a laboratory, under conditions different from those that produce natural diamonds and at a time scale far faster than that which occurs in the earth. Similarly, the ‘189 Patent describes a method for annealing diamonds in a manner that does not occur in nature. While both methods necessarily rely on principles of chemistry and physics, so, at some level, do most inventions. See Mayo, 566 U.S. at 71. For that reason, the Supreme Court has long recognized that “the application of the law of nature to a new and useful end” is a valid basis for a patent. Id. at 72 (quoting Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948)).

Although it is sometimes challenging for courts to distinguish between laws of nature and applications thereof, the facts here clearly fall into the latter category. The analysis in Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 569 U.S. 576 (2013) is illustrative. There, the Supreme Court held that newly-isolated segments of naturally-occurring DNA are not patentable, but that segments of synthetically-created DNA are. The lab-grown diamonds at issue here are more like the synthetic DNA; both are facsimiles of natural substances, created from the same atomic building blocks but assembled through processes that do not occur in nature. The patents-in-suit are therefore not directed to a law of nature.

PGD's arguments are really not to the contrary. As to the '189 Patent, PGD argues that the tendency of diamond to change its optical properties under HPHT conditions is not only a natural phenomenon relating to the chemical properties of carbon, but also one already known since the 1970s. PGD's Mem. of Law in Supp. of Mot. to Dismiss Pls.' Compl., 20-cv-189 (JSR), ECF No. 29 (Mar. 30, 2020) at 5.<sup>7</sup> Against this backdrop, the only advance claimed by the '189 patent is the application of this same method to CVD diamond, a claim which is tantamount

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<sup>7</sup> See also Annealing Type IB or Mixed Type IB-IA Natural Diamond Crystal, U.S. Patent No. 4,124,690 (filed Dec. 2, 1977).



to application of a natural law as synthetic and natural diamonds have identical chemical properties. Id. at 10. Similarly, as to the '078 Patent, PGD argues that the Patent merely directs the application of a known natural law – the tendency of single-crystal diamond to grow more efficiently under uniform temperature conditions – to a method known in the prior art. See id. at 14-15.

These points, however, sound more in “obviousness” than they do in eligibility, and such objections are not currently before the Court. PGD cannot seriously argue that plaintiffs are attempting to patent the diamond growth process that occurs in the earth’s crust; the true nature of PGD’s argument is that plaintiffs’ patents represent an insufficient advance over the prior art. But such disputes are properly reserved for a later stage of the litigation.<sup>8</sup>

#### **B. Plausibility of Pleadings**

Next, all defendants move to dismiss under Fed. R. Civ. P. 12(b)(6), arguing that plaintiffs’ complaints in the two

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<sup>8</sup> The instant case is accordingly distinguished from Am. Axle & Mfg., Inc. v. Neapco Holdings LLC, 939 F.3d 1355 (Fed. Cir. 2019). There, the court held a patent ineligible under § 101 because the only claimed advance was the application of a mathematical equation called Hooke’s law to a manufacturing process known in the prior art. But this appeal occurred at the summary judgment stage, when the court had the benefit of a record outside the pleadings in determining that the patent claimed nothing more than application of this law of nature.

respective actions do not plausibly allege infringement. To survive a motion to dismiss, a complaint must allege “enough facts to state a claim to relief that is plausible on its face.” Bell Atl. Corp. v. Twombly, 550 U.S. 544, 570 (2007). If a complaint “pleads facts that are ‘merely consistent with’ a defendant’s liability, it ‘stops short of the line between possibility and plausibility of entitlement to relief.’” Ashcroft v. Iqbal, 556 U.S. 662, 678 (2009) (quoting Twombly, 550 U.S. at 557) (internal quotation marks omitted).

To make a claim for direct infringement, plaintiffs must allege that defendants’ methods “meet[] every claim limitation either literally or under the doctrine of equivalents.” Pfizer, Inc. v. Teva Pharm., USA, Inc., 429 F.3d 1364, 1376 (Fed. Cir. 2005). Plaintiffs’ complaints in both actions do so. The complaints plead, “upon information and belief,” that defendants are manufacturing, importing, and/or selling high-quality “Type IIa” diamonds produced through the MPCVD process. PGD Compl. ¶¶ 81-86, 87-91; Fenix Compl. ¶¶ 51-60. From just this allegation, plaintiffs infer that defendants’ diamonds must have been grown and/or annealed using the processes patented in the ‘078 and ‘189 Patents. PGD Compl. ¶¶ 98-100, 125-26; Fenix Compl. ¶¶ 65-67, 88-89. Although this factual basis is somewhat limited, the Court finds it minimally sufficient to state a claim for direct infringement. Based on the allegations that defendants’ diamonds

could not be of the type and quality claimed unless produced through infringing methods, see, e.g., PGD Compl. ¶¶ 88-90, 123; Fenix Compl. ¶¶ 53-57, 87, it is at least plausible that defendants are directly infringing the patents-in-suit.

Defendants' reliance on Artrip v. Ball Corp., 735 Fed. App'x 708 (Fed Cir. 2018) does not persuade the Court otherwise. There, the Federal Circuit affirmed the dismissal of a complaint that alleged infringement with nothing more than "broad functional language" and that did not specifically identify the defendant's purportedly infringing products. Id. at 714-15. But the complaint's failure there was far more egregious than anything at issue here. Specifically, the plaintiff in that case had already taken two opportunities to amend the complaint and had already been provided with limited discovery. Despite all of that, the complaint at issue was only twenty-three paragraphs in length. See Third Amended Complaint, No. 1:14-cv-14 (JPJ) (PMS), ECF No. 111 (W.D. Va. Sept. 14, 2017). Plaintiffs here, with less information than the plaintiff in Artrip, have nonetheless advanced more plausible and complete allegations.

Plaintiffs have also satisfactorily alleged the scienter element of induced and willful infringement. "[I]nduced infringement under [35 U.S.C.] § 271(b) requires knowledge that the induced acts constitute patent infringement." Global-Tech Appliances, Inc. v. SEB S.A., 563 U.S. 754, 766 (2011).

Similarly, a claim for willful infringement requires a violation that is “willful, wanton, malicious, bad-faith, deliberate, [or] consciously wrongful.” See Halo Elecs., Inc. v. Pulse Elecs., Inc., 136 S. Ct. 1923, 1932 (2016). Here, plaintiffs rely on the general notoriety of their patents in the relevant field, as well as, in the case of PGD, the fact that its Chief Technical Officer was himself the named inventor on at least seven diamond patents. See PGD Compl. ¶¶ 111, 135; Fenix Compl. ¶¶ 75-76, 96. Although something of a close call, the Court finds this sufficient at this stage to raise a plausible inference that defendants knew of the patents-in-suit. The motions to dismiss for failure to state a claim are accordingly denied.

#### **CLAIM CONSTRUCTIONS**

Because plaintiffs’ complaints survive defendants’ motions to dismiss, the Court must next consider the parties’ motions for construction of several terms in the relevant claims of the ‘078 and ‘189 Patents pursuant to Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996). Specifically, after the parties had extensively briefed their respective positions, the Court conducted a lengthy “Markman” hearing on April 24, 2020. See Transcript, Apr. 24, 2020 (forthcoming on ECF).

Specifically, the claim construction issues below relate to two independent claims of the ‘078 Patent. Claim 1 recites:

A method for diamond production, comprising: controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are less than 20°C.; and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface at a growth temperature in a deposition chamber having an atmosphere with a pressure of at least 130 torr.

'078 Patent at 14:64-15:4. Claim 12 recites:

A method for diamond production, comprising: controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are less than 20°C.; and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface at a temperature of 900-1400°C.

Id. at 15:31-37.

There are further claim construction questions relating to Claim 1 of the '189 Patent, which recites:

A method to improve the optical clarity of CVD diamond where the CVD diamond is single crystal CVD diamond, by raising the CVD diamond to a set temperature of at least 1500°C. and a pressure of at least 4.0 GPA outside of the diamond stable phase.

'189 Patent at 4:10-14.

In construing these claims, the Court must give their terms the meaning understood by a person of ordinary skill in the art at the time of invention. Phillips v. AWH Corp., 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). "Properly viewed, the 'ordinary meaning' of a claim term is its meaning to the ordinary artisan after reading the entire patent." Id. at 1321.

#### **A. Claim Constructions for the '078 Patent**

1. "controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are less than 20°C." (Claims 1 and 12)

Plaintiffs' Construction	PGD's Construction	Fenix's Construction
no construction needed (plain and ordinary meaning)	plain and ordinary meaning, that is, "using temperatures measured at the middle and an edge of a growth surface of the diamond to maintain all temperature gradients across the growth surface at less than 20°C."	[same as PGD's]

The term at issue relates to a key advance claimed in the '078 Patent – a method for controlling not just the temperature of particular spots on the growth surface of a CVD diamond, but all temperature gradients across the growth surface, i.e., the differences in temperature between any one spot on the growth surface and any other. See '078 Patent at 7:10-11. All three parties purport to give this term its "ordinary" meaning, and plaintiffs argue that no construction is needed at all. But the defendants in both actions advance a (common) construction that limits the term in three ways: (1) to refer to one particular set of temperature gradients ("temperatures measured at the middle and an edge of a growth surface of the diamond"); (2) to require that those particular gradients be "us[ed] . . . to maintain all temperature gradients" at less than 20°C.; and (3)

to clarify that those temperature gradients must be "maintain[ed]" below the 20° level.

As to the first issue, defendants' proposed limitation to the particular set of temperature gradients between the middle and the edge of the growth surface is expressly contradicted by the language of the Patent. See Merck & Co., Inc. v. Teva Pharm. USA, Inc., 347 F.3d 1367, 1371 (Fed. Cir. 2003) ("A fundamental rule of claim construction is that terms in a patent document are construed with the meaning with which they are presented in the patent document.").

Claims 1 and 12 refer to "all temperature gradients across the growth surface," not merely those measured between the middle and the edge. Concededly, the Patent teaches that large temperature variations "typically . . . occur between the edges and the middle of the growth surface of the diamond." '078 Patent at 7:10-13; see also id. at 7:13-15, 19-23, 41-46. This would suggest that, in most cases, if the middle-edge gradient is less than 20°C., then all of the gradients will be. But the language of this explanation is not nearly so categorical as defendants portray it to be. The Patent does not preclude the possibility that the temperature gradient between two points on the edge of the growth surface could, in rare cases, exceed that between the middle and the edge. In that case, the claimed method still teaches that the larger gradient must be below

20°C. The Court accordingly rejects defendants' limitation to "temperatures measured at the middle and an edge of a growth surface of the diamond."

The Court also agrees with plaintiffs that the "using" limitation must be rejected. Defendants' construction suggests that the middle-edge gradients are the only inputs used in the method to maintain appropriate temperatures around the diamond seed. Defendants point to certain of the Patent's descriptions of the method, which suggest that it "uses" these temperature measurements to control the gradient. E.g. '078 Patent at 2:45-52 ("In accordance with another embodiment of the present invention, a method for producing diamond includes . . . controlling temperature of the growth surface based upon the temperature measurements . . . ."); id. at 6:65-7:2. But other language in the Patent appears to define "controlling" more broadly, mentioning that other inputs are also "used" to control the gradients. Id. at 6:55-65 ("The ability to control all of the temperature gradients across the growth surface of the diamond is influenced by several factors, including the heat sinking capability of the stage, the positioning of the top surface of the diamond in the plasma, the uniformity of the



plasma that the growth surface of the diamond is subjected to, . . . [etc.]").<sup>9</sup>

The final issue that defendants raise with respect to this term is that the proper construction must include a temporal limitation, i.e., that the that the temperature gradients on the growth surface must be "maintained" at less than 20°C. during the growth process, rather than achieved for a mere instant. The Court agrees. The Patent's description of the method repeatedly suggests that the gradients must be maintained below this threshold for substantially the entire growth process in order to achieve the desired single-crystal diamond growth. Not only does the Patent explain that the growth process is suspended if the gradients cannot be sufficiently controlled, id. at 11:20-24, but the Patent itself even uses the word "maintain" in this context, id. at 11:15-16 ("The main process controller controls the temperature by maintaining thermal gradients of less than 20°C. across the growth surface.") (emphasis supplied).<sup>10</sup> Because

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<sup>9</sup> The heart of defendants' objection here is that plaintiffs' construction would allow "the asserted claims [to] be infringed without the alleged infringer even trying to achieve temperature gradients less than 20°C." But the word "control" in Claims 1 and 12 is plainly qualified by the other factors quoted above.

<sup>10</sup> So, too, do plaintiffs' complaints in both actions. PGD Compl. ¶ 68 ("The '078 Patent teaches a method for producing MPCVD diamonds using a faster growth rate, moderate pressures within the deposition chamber, and with a particular temperature gradient to be maintained during diamond growth.") (emphasis supplied); Fenix Compl. ¶ 37 (same quote).

the Court's construction must "stay[] true to the claim language and . . . align[] with the patent's description of the invention," Trs. of Columbia Univ. v. Symantec Corp., 811 F.3d 1359, 1366 (Fed. Cir. 2016) (citation omitted), the Court agrees that a temporal limitation must be added to the construction of this term.

For these reasons, the Court adopts the following construction for the term at issue: "controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are maintained at less than 20°C."

*2. "the growth surface" (Claims 1 and 12)*

<b>Plaintiffs' Construction</b>	<b>PGD's Construction</b>	<b>Fenix's Construction</b>
plain and ordinary meaning, that is, "the diamond seed surface or diamond surface that is closest to the plasma, upon which single-crystal growth primarily occurs as the diamond grows"	plain and ordinary meaning, no construction necessary	plain and ordinary meaning, that is, "the surface upon which diamond growth is occurring"

The parties next seek construction of "the growth surface." The difference between their positions is minor; all parties appear to agree that a skilled artisan would read this term to refer to the surface on which diamond growth is occurring at a given moment in the MPCVD process. At the outset, that is, the

growth surface is the exterior surface of the diamond seed, but the growth surface then shifts outward as the hydrocarbon gases accrue onto the seed to form new diamond. See '078 Patent at 4:64-67.

As to the defendants' competing proposals, although the Court may accord simple words their ordinary meaning, Chef Am., Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1373 (Fed. Cir. 2004), Fenix's proposal more accurately captures the fact that the area constituting the growth surface changes over time.

Plaintiffs' proposed construction, on the other hand, would wrongly restrict the term to include only surface area where single-crystal diamond is growing. The Patent notes that, even where its method of growing single-crystal diamond is followed, small amounts of polycrystalline diamond will nonetheless grow in localized places on the diamond. See '078 Patent at 13:66-14:1. For two reasons, such areas should still be included within the definition of "growth surface." First, where the term is used in the Patent, the surrounding context generally does not require such a distinction. E.g., id. at 2:12-65; 4:56-67; 7:5-23. Since the Patent uses the term to refer to the entire surface where hydrocarbon gases are accruing into new diamond, the claim construction must impart the same meaning. See Merck & Co., 347 F.3d at 1371. Second, the Patent notes that the MPCVD method, if applied with different parameters, can also be used to

produce synthetic polycrystalline diamonds. '078 Patent at 13:25-26. An artisan knowledgeable in this field would therefore also recognize the term "growth surface" to have the same meaning described above in a process intended to produce polycrystalline diamond. The construction of the term "growth surface" must therefore not exclude polycrystalline growth.

The Court accordingly adopts Fenix's proposed construction of this term.

3. *"growing single-crystal diamond . . . on the growth surface at a growth temperature in a deposition chamber having an atmosphere with a pressure of at least 130 torr" (Claim 1)*

<b>Plaintiffs' Construction</b>	<b>PGD's Construction</b>	<b>Fenix's Construction</b>
plain and ordinary meaning, no construction needed	plain and ordinary meaning, that is, "growing single-crystal diamond ... on the growth surface, which is maintained at a growth temperature and located in a deposition chamber with an atmosphere maintained at a pressure of at least 130 torr"	[same as PGD's]

*"growing single-crystal diamond . . . on the growth surface at a temperature of 900-1400° C" (Claim 12)*

<b>Plaintiffs' Construction</b>	<b>PGD's Construction</b>	<b>Fenix's Construction</b>
plain and ordinary meaning, no construction needed	plain and ordinary meaning, that is, "growing single-crystal diamond ...	[same as PGD's]

	on the growth surface, which is maintained at a temperature of 900–1400° C”	
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Turning next to two similar phrases that appear in Claim 1 and Claim 12 respectively, plaintiffs argue that no construction of these terms is necessary, while defendants jointly seek a construction that limits the terms in two ways. The first proposed limiting construction clarifies that the stated temperature conditions refer to the temperature of the growth surface, rather than the temperature of the deposition chamber as a whole. The second proposed limitation is to clarify that the temperature and pressure conditions referenced in Claims 1 and 12 must be “maintained” throughout the growth process.

The Court largely agrees with defendants as to both issues. With respect to the first, the specification of the ‘078 Patent refers repeatedly to the temperature on the growth surface, rather than the temperature inside the deposition chamber as a whole. E.g. ‘078 Patent at Abstract (“[A] . . . device positioned to measure temperature of the diamond across the growth surface . . .”); id. at 6:48–50 (“The main process controller . . . controls the temperatures of the growth surface . . . .”); id. at 11:1–3 (“[T]he temperature of the growth surface of the diamond, either the diamond seed or grown diamond, is measured.”). It is obvious from this context that

the relevant temperature for purposes of the patented method is the temperature of the growth surface. Reading the "claim language 'in view of the specification, of which [the claims] are a part,'" Guardian Media Techs., Inc. v. Amazon.com, Inc., No. 13-cv-8369 (PSG) (PLAx), 2015 WL 12656953, at \*4 (C.D. Cal. Apr. 1, 2015) (quoting Phillips, 415 F.3d at 1315) (alteration in original), the Court adopts the defendants' construction with respect to this issue.

As to the second issue – whether the stated temperature and pressure conditions must be "maintained" throughout the growth process – this issue involves many of the same disputes as discussed above in the context of the temperature gradient term. For similar reasons, the Court agrees with defendants that plaintiffs' construction wrongly suggests that a method that imposes the specified temperatures and pressures even momentarily would infringe the '078 Patent. Such a construction would be improper because the '078 Patent expressly distinguishes the claimed method from prior art CVD processes that utilize lower temperatures and pressures to synthesize diamond at a lower growth rate. See '078 Patent at 1:42-61. When the "description of the invention describes a feature . . . and criticizes other products . . . that lack that same feature, this operates as a clear disavowal of these other products." Astrazeneca AB v. Mut. Pharm. Co., 384 F.3d 1333, 1340 (Fed Cir.

2004). The clear implication of this contrasting description is that the stated temperatures and pressures must be applied during a substantial portion of the growth process.

Plaintiffs respond that the word "maintain" means that these temperature and pressure conditions must be achieved for the entirety of the growth process, and not just a majority or even substantially all of it. Plaintiffs note that both Claim 1 and Claim 12 begin with the transitional word "comprising," which at least one other court has read to imply that a subsequent list of steps was not intended to be exhaustive. See Invitrogen Corp. v. Biocrest Mfg., L.P., 327 F.3d 1364, 1366-68 (Fed. Cir. 2003). The Court agrees that the construction of this term should not exclude brief introductory and concluding steps that occur outside of the stated temperature and pressure ranges. "Maintain," therefore, is too restrictive of a word in this context,<sup>11</sup> and the Court will substitute the slightly broader word "set."

For these reasons, the following constructions are adopted: for the term in Claim 1, "growing single-crystal diamond ... on the growth surface, which is set at a growth temperature and

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<sup>11</sup> Plaintiffs raised this same argument above in the context of the temperature gradient term. But there, as noted, the Court is persuaded that the term "maintain" is appropriate because the '078 Patent itself – as well as plaintiffs' complaints in these actions – use the word "maintain" in the relevant context.

located in a deposition chamber with an atmosphere set at a pressure of at least 130 torr”; and for the term in Claim 12, “growing single-crystal diamond ... on the growth surface, which is set at a temperature of 900–1400°C.”

#### **B. Claim Constructions for the '189 Patent**

##### *1. “to improve the optical clarity of [a] CVD diamond”*

<b>Plaintiffs' Construction</b>	<b>PGD's Construction</b>	<b>Fenix's Construction</b>
plain and ordinary meaning, that is, “to decrease the opacity of CVD diamond”	This phrase is non-limiting. In the alternative, plain and ordinary meaning, that is, “to make CVD diamond appear more clear”	This phrase is non-limiting. If limiting, then the phrase is indefinite.

The threshold (and definitive) dispute with respect to this term is whether it is limiting. The Court agrees with defendants that it is not. The contested phrase appears as part of Claim 1's preamble, i.e., it describes the purpose or intended use of the method, rather than a step of the method. The Federal Circuit “ha[s] long ruled that ‘a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.’” Arctic Cat Inc. v. GEP Power Prods., 919 F.3d 1320, 1328 (Fed. Cir. 2019) (quoting Catalina Mktg. Int'l v. Coolsavings.com, Inc., 289 F.3d 801, 808 (Fed. Cir. 2002)) (internal quotation marks omitted). Application of



this canon of construction would therefore suggest that the instant term is not limiting.

Plaintiffs respond that the phrase is limiting because it provides the antecedent for the later use of the phrase "CVD diamond" throughout the claim; reading the claim with the preamble included therefore is ungrammatical. Pls.' Rebuttal Claim Construction Br. at 18, 20-cv-189 (JSR), ECF No. 37 (Apr. 17, 2020). But this is just a product of the particular wording chosen by the drafter of the Patent; that is, the phrase could have been defined outside of the preamble without affecting the substance of the claim. See Am. Med. Sys. v. Biolitec, Inc., 618 F.3d 1354, 1359 (Fed. Cir. 2010) ("[T]he preamble has no separate limiting effect if, for example, 'the preamble merely gives a descriptive name to the set of limitations in the body of the claim that completely set forth the invention.'") (quoting IMS Tech., Inc. v. Haas Automation, Inc., 206 F.3d 1422, 1434 (Fed. Cir. 2000)). The Court accordingly finds plaintiffs' argument unpersuasive, and this term will not be given limiting effect.

2. *"by raising the CVD diamond to a set temperature of at least 1500°C. and a pressure of at least 4.0 GPA outside of the diamond stable phase"*

<b>Plaintiffs' Construction</b>	<b>PGD's Construction</b>	<b>Fenix's Construction</b>
"by raising the CVD diamond to a set temperature of at	[same as plaintiffs']	[same as plaintiffs']

least 1500° C. and a pressure of at least 4.0 gigapascals (GPA), where the temperature and the pressure are together outside of the diamond stable phase"		
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The parties have stipulated to the above construction. Although "the Court is not required to adopt a construction of a term, even if the parties have stipulated to it," Lam Research Corp. v. Schunk Semiconductor, 65 F. Supp. 3d 863, 871 (N.D. Cal. 2014) (emphasis and citation omitted), here the Court agrees that a skilled artisan would give this term its stipulated meaning.

The phrase "diamond stable phase" refers to temperature-pressure phase diagram of carbon, which appears at page 19 of defendant PGD's opening claim construction brief, 20-cv-189 (JSR), ECF No. 32 (Apr. 8, 2020). This diagram depicts that, depending on the temperature and pressure that it is subject to, elemental carbon will exist as either diamond, graphite, or a liquid. The "diamond stable phase" is the set of temperatures and pressures under which carbon exists as diamond. The chart also depicts a boundary, the "diamond-graphite boundary," between the diamond stable phase and the graphite stable phase, i.e., the temperatures and pressures under which carbon exists as graphite.

What necessitates construction here derives from the fact that the claim is poorly drafted. Read literally, the claim would refer to CVD diamond subject to (1) a temperature over 1500°C and (2) a pressure of at least 4 gigapascals “outside the diamond stable phase,” i.e., at least 4 gigapascals below the diamond-graphite boundary for a given temperature.

But that reading is nonsensical, both as a scientific matter and from the context of the Patent. The temperatures and pressures described in the Patent’s example, see ‘189 Patent at 3:16-4:8, are inconsistent with this literal reading but consistent with the stipulated construction. A skilled artisan, therefore, would read the claim in its context to have this stipulated meaning, i.e., CVD diamond subject to (1) a temperature over 1500 degrees C, (2) a pressure of at least 4 gigapascals, and (3) a temperature and pressure combination that falls below the diamond-graphite boundary. The Court accordingly adopts the parties’ construction.

### C. Claim Constructions for Both Patents

1. “single-crystal diamond” (‘078) and “single crystal CVD diamond” (‘189)

Plaintiffs’ Construction	PGD’s Construction	Fenix’s Construction
plain and ordinary meaning, that is, “a stand alone diamond [made by chemical vapor deposition] having a	plain and ordinary meaning, that is, “a stand alone diamond [made by chemical vapor deposition] having insubstantial	plain and ordinary meaning, that is, “a stand alone diamond [made by chemical vapor deposition]

substantially single-crystal structure"	non-monocrystalline growth"	having insubstantial polycrystallinity"
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Finally, the parties seek construction of the term "single-crystal diamond" in the '078 Patent and the equivalently-used term "single crystal CVD diamond" in the '189 Patent. The parties agree that a "single-crystal" diamond is a stand-alone diamond that has a primarily single-crystal, as opposed to polycrystalline, structure. They also agree that a diamond can still be deemed single-crystal even if it contains small and localized amounts of polycrystallinity or other impurities, such as graphite, twinned diamond, or diamond-like carbon, in its atomic structure. See '078 Patent at 13:66-14:1; see also id. at 1:38-40; 5:5-9; 13:25-27. But they disagree about how to describe the amount of impurity that is acceptable.

There is a small substantive difference between the competing constructions, as plaintiffs' construction appears somewhat broader than defendants'. Many of plaintiffs' arguments in particular, however, focus not on the accuracy of these constructions but on which descriptions a lay jury would most readily understand. See Pls.' Opening Claim Construction Br. at 21-23. The Court need not consider these arguments. A court's mandate in a Markman hearing is to give a patent's terms the meaning that a skilled artisan would accord to them, not a meaning that a lay jury would find accessible. See Phillips, 415

F.3d at 1313. The Court is therefore unpersuaded by plaintiffs' arguments that defendants' constructions are confusingly worded.

As to the substantive differences between the parties, the Court agrees that plaintiffs' construction is too broad. The '078 Patent in two places uses the term "substantially single-crystal diamond," '078 Patent at 16:64-65; 18:13-14, thereby distinguishing that term from "single crystal diamond." Plaintiffs' construction would include both, rendering the distinction in the Patent meaningless.

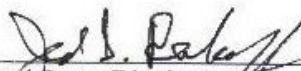
Between the two defendant groups' constructions, PGD's correctly captures that polycrystalline diamond is not the only type of non-single crystal growth. (It is not clear how Fenix's construction, for example, would categorize an otherwise-single crystal diamond containing more than an insubstantial amount of twinned diamond or diamond-like carbon.) For that reason, the Court adopts PGD's construction.

#### **CONCLUSION**

For the foregoing reasons, defendants' motions to dismiss are denied in their entirety, and the Court adopts the claim constructions stated above.

SO ORDERED

Dated: New York, NY  
May 8, 2020

  
United States District Judge